

SECTION A.

TECHNICAL NOTES



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## SCOPE OF SURVEY

The data presented in these tables are collected biennially through the National Science Foundation's (NSF) congressionally mandated Survey of Scientific and Engineering Research Facilities (Facilities survey). The survey originated in 1986 in response to Congress' concern about the state of research facilities at the Nation's colleges and universities. NSF's 1984 reauthorization legislation, P.L. 99-159, mandated a data collection and analytic system to identify and assess the research facilities needs of academic institutions. The legislation stated:

The National Science Foundation is authorized to design, establish, and maintain a data collection and analysis capability in the Foundation for the purpose of identifying and assessing the research facilities needs of universities and colleges. The needs of universities by major field of science and engineering, for construction and modernization of research laboratories, including fixed equipment and major research equipment, shall be documented. University expenditures for the construction and modernization of research facilities, the sources of funds, and other appropriate data shall be collected and analyzed. The Foundation, in conjunction with other appropriate Federal agencies, shall report the results to Congress. (42 U.S.C. 1886)

The National Institutes of Health (NIH) have cosponsored all cycles of the survey. Each survey cycle, except for 2001, NIH has added a limited set of questions particularly focused on animal research facilities. The 2001 survey cycle used an abbreviated form of the previous surveys, which only included prior questions one and two.

## POPULATION

The survey is sent to research-performing colleges and universities in the United States. Research-performing colleges and universities are defined as meeting one of three criteria: 1) offer doctorates in S&E fields; 2) report at least \$150,000 in research and development (R&D) expenditures for fiscal year 2000; or 3) are an Historically Black College or University (HBCU) with any R&D expenditures. The population of academic institutions for this survey is derived from the 2000 NSF Survey of Research and Development Expenditures at Universities

and Colleges. The six uniformed service academies are excluded from the population.

The academic survey population included 580 institutions. These institutions did not in all cases represent separate colleges and universities. Some institutions consisted of several, separate entities each of which were sent separate surveys. For example, the Louisiana State University Agricultural and Mechanical College and the Louisiana State University Health Science Center were sent separate surveys. In determining the number of surveys to send to an institution, the Survey of Scientific and Engineering Research Facilities employed the same procedures as the NSF Survey of Research and Development Expenditures at Universities and Colleges. In the final population of 580, 14 entities represented five colleges or universities. As a consequence, the total population presented in Table 4 is 571.

The survey is also sent to nonprofit biomedical research organizations. Biomedical research organizations are part of the eligible population if they are a research hospital or a nonprofit biomedical research organization. The population of biomedical research and organizations is derived from a 2000 list of NIH grantees receiving at least \$150,000 in funding from NIH.

## DATA DEFINITIONS

**Research** is all science and engineering R&D activities that is budgeted and accounted for. Research can be funded by the institution itself, the Federal Government, state governments, foundations, corporations or other sources.

**Research space** includes: research laboratories; controlled environment space such as clean or white rooms; technical support space such as carpentry and machine shops; space for laboratory animals, such as animal production colonies, holding rooms, isolation and germ-free rooms; faculty or staff offices to the extent that they are used for research; department libraries, to the extent that they are used for research; fixed equipment, such as fume hoods and benches; single pieces of non-fixed equipment each costing at least \$1 million, such as MRI equipment; and leased space. It does not include: space that is designated as federally funded research and development centers (FFRDCs); space used by faculty

but not administered by the institution such as research space at non-university hospitals; and space administered by the institution but is leased to others for their use.

**Biomedical research space** is space for research in the biological sciences in medical schools, biological sciences not in medical schools, medical sciences in medical schools and medical sciences not in medical schools.

**Net assignable square feet (NASF)** is the sum of all areas (in square feet) on all floors of a building assigned to, or available to be assigned to, an occupant for specific use, such as instruction or research. NASF is measured from the inside faces of walls.

**Research program commitments** are all research activities of an institution that are budgeted, approved, and funded. It includes current faculty and staff or those to whom offers have been made; grants awarded, whether or not research has actually begun; and, programs which have been approved.

## CHANGES IN REPORTING

Since these data were first collected in 1986, several changes have been made to the population, the sample, and some of the survey questions. Some of the changes include:

- Prior to the 1999 cycle of the survey, research-performing academic institutions with at least \$50,000 in R&D expenditures (other than HBCUs) were included in the survey population. Starting with the 1999 survey cycle, the level of R&D expenditures was increased to at least \$150,000 (except HBCUs). For biomedical organizations, the minimum level in NIH funding received, also increased from at least \$50,000 to at least \$150,000 in funding in the 1999 survey cycle.
- Beginning in 1999, a census of eligible institutions is surveyed. In prior years, eligible institutions were sampled using a stratified sampling design.
- For the 2001 cycle of the survey, only questions one and two of the prior surveys are asked.

## ANALYTIC DEFINITIONS

Several analytic subgroups are presented in the table data. These subgroups are defined as follows.

## REGIONS

In some tables, states are divided into the four U.S. regions defined by the U.S. Census Bureau. These regions are:

- Northeast: ME, NH, VT, MA, RI, CT, NY, NJ, PA.
- Midwest: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS.
- South: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX.
- West: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI.

## EPSCoR AND IDEa

In addition to the regional groupings, in some tables, states are grouped according to their eligibility for NSF or NIH funding. States are eligible for the NSF Experimental Program to Stimulate Competitive Research (EPSCoR), if they have historically received less Federal R&D funding than other states. The purpose of the program is to increase the R&D funding competitiveness of these states by assisting in the development and utilization of science and technology resources located at the major universities.

NIH sponsors the Institutional Development Award (IDeA) program. This program was established in 1993 in order to enhance the competitiveness for research funding of institutions located in states with historically low aggregate success rates for NIH grant applications. The goal is to broaden the geographic distribution of NIH funding for health research.

The states currently eligible for these programs are as follows:

- EPSCoR: AL, AK, AR, ID, KS, KY, LA, ME, MS, MT, NE, NV, ND, OK, SC, SD, VT, WV, WY and Puerto Rico.
- IDeA: AK, AR, DE, HI, ID, KS, KY, LA, ME, MS, MT, NH, NM, NE, NV, ND, OK, RI, SC, SD, VT, WV, WY and Puerto Rico.

## MINORITY DESIGNATIONS

The survey included subgroups to identify minority-serving institutions, including Historically Black Colleges and Universities (HBCUs) and Hispanic-Serving institutions (HSIs). According to the Department of Education, HBCUs are postsecondary institutions of higher education

founded before 1964 whose educational mission has historically been the education of black Americans. The HBCU list (updated August 1999) was provided by the White House Initiative on HBCUs. The original Survey of Scientific and Engineering Research Facilities included 29 HBCUs. These institutions have been identified separately for trend analysis.

Hispanic-serving institutions (HSIs) are defined as any accredited and degree-granting institution of higher education with 25 percent or greater total Hispanic undergraduate full-time equivalent enrollment. An institution may be both an HBCU and an HSI. A list maintained by the Department of Education (revised March 27, 2000) is the source of information on this group of schools. See Section C for a List of Institutions surveyed.

## OTHER DEFINITIONS

Two other analytic subgroups are used in the tables. **Field leaders** are defined as the 10 institutions with the most research space in a given field. **Institutional control** is defined as private or public institutions.

## DATA CONSIDERATIONS

Users should be aware of the several definitions associated with medical schools. Institutions are defined as having space 'in medical schools' if respondents indicated that they had space in either the biological sciences in medical schools or the medical sciences in medical schools, regardless of whether the medical schools are accredited. For the rows entitled 'Inside all AAMC medical schools,' data are only included for academic institutions with medical schools accredited by the Association of American Medical Colleges (See Section C). Both sets of data include stand-alone medical schools. In table data from prior survey cycles, the former definition of medical schools is used for all tables.

## RESPONSE RATE

The 2001 survey was mailed to academic institutions in April of 2001 and data collection ended on July 24, 2001.

Of the 580 eligible academic institutions, 90 percent returned surveys. Of the 245 eligible biomedical institutions, 88 percent returned surveys.

## IMPUTATION

The 2001 NSF Research Facilities Survey attempted to obtain responses from all the institutions in the defined

population. Consequently, one of the usual sources of survey error, sampling error, is not of concern in this survey. However, as is the case in almost all surveys, nonresponse error is of concern. In the 2001 NSF Research Facilities Survey, 90 percent of all eligible institutions responded.

To estimate national totals, data were imputed for the individual institutions which did not respond with any data for the 2001 survey cycle. Data were imputed using a model-based approach for the following academic institution variables: total amount of S&E research space; total amount of S&E instructional space; total amount of non-S&E instructional space; amount of S&E research space in individual fields of science; and amount of S&E instructional space by individual fields of science.

Data were not imputed for academic institutions for the following variables: total amount S&E research space leased; total amount of S&E research space needed; whether S&E research space is leased (yes or no) for individual fields of science; whether S&E research space is adequate (yes or no) by individual fields of science; and, amount of S&E research space needed by individual field of science.

Data were imputed separately for academic institutions and for biomedical institutions. For biomedical research institutions, the following variables were imputed: total amount of S&E research space in the biological sciences and the medical sciences and the amount of S&E research space in individual fields of biological and medical sciences. Data were not imputed for the following variables: total amount S&E research space leased in the biological and medical sciences; total amount of S&E research space needed in the biological and medical sciences; whether S&E research space is leased (yes or no) for the biological and medical sciences; whether S&E research space is adequate (yes or no) for the biological and medical sciences; and, the amount of S&E research space needed by the individual fields of biological and medical sciences.

Approximately 90 percent of the institutions responded to the survey. Therefore, except for the dichotomous variable on the adequacy of research space, the national estimates provided for the unimputed variables are likely to underestimate the true values for these variables. The true values for the adequacy of research space is uncertain but it is not believed to be greatly different from the estimated values.

Several regression models were used to impute values for nonrespondent institutions. If a 2001 nonrespondent had responded in 1999, the 1999 data were used as the 2001 data. Otherwise, the following models were used:

For academic nonrespondents:

- Total S&E research space for 2001 =  $37,553 + 3.676 \times \text{total R\&D expenditures in FY 2000} + 14.714 \times \text{total R\&D expenditures for the agricultural sciences in FY 2000}$ .
- Total S&E instructional space for 2001. The ratio of total instructional space to total S&E research space was determined for respondents. This ratio was then applied to impute total instructional space for each nonresponding institution.
- Total non-S&E instructional space for 2001. The ratio of total non-S&E instructional space to total instructional space was determined for the respondents. This ratio was then applied to impute total non-S&E instructional space values for each nonresponding institution.
- Amount of S&E research space in individual fields of science in 2001. The distribution of total S&E research space across all 13 research fields was determined using the respondent data. For the nonrespondents, their total S&E research space was then distributed across all 13 research fields.
- Amount of S&E instructional space for individual fields of science in 2001. The distribution of total S&E instructional space across all 13 research fields was determined for respondent institutions. Data for the nonrespondents were imputed by distributing their total S&E research space across all 13 research fields using the same percentages.

For biomedical research hospitals:

- Total S&E research space for 2001 =  $28,791 + .009698 \times \text{amount of support received from NIH in FY 2000}$ .
- Amount of S&E research space in the biological and medical sciences in 2001. The distribution of total S&E research space across the biological and medical research fields was determined using the respondent data. For the nonrespondents, their total S&E research space was then distributed across the two science fields.

For biomedical research organizations:

- Total S&E research space for 2001 =  $32,749 + .00134 \times \text{amount of support received from NIH in FY 2000}$ .
- Amount of S&E research space in the biological and medical sciences in 2001. The distribution of total S&E research space across the biological and medical research fields was determined using the respondent data. For the nonrespondents, their total S&E research space was then distributed across the two science fields.

## ITEM NONRESPONSE

There was no item nonresponse.

## DATA AVAILABILITY

Data published in this report are also available on the World Wide Web and can be found at <http://www.nsf.gov/sbe/srs/stats.htm>. Due to a pledge of confidentiality with the responding institutions, individual institutional data are not available; all data are in aggregate form only.